Strategy Research Project

SUSTAINING OUR SPACE ENTERPRISE: STRATEGY AND PEOPLE

BY

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This paper focuses on the NSSE, specifically the people that lead and manage it and the lack of a National Space Strategy to provide it unity of effort. The paper provides a brief history of U.S. space programs and the national policy that guides it to help frame the issues. It then elaborates on how the lack of a consolidated and overarching space strategy negatively impacts the future of the NSSE and discusses concerns regarding the cadre of space professionals required to meet the challenges of a rapidly changing environment and recommends possible solutions.

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SUSTAINING OUR SPACE ENTERPRISE: STRATEGY AND PEOPLE

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SUSTAINING OUR SPACE ENTERPRISE: STRATEGY AND PEOPLE

In 1957, the launch of Sputnik by the Soviet Union acted as the impetus that thrust the emerging U.S. Space Program into a space race that drove the program toward its current organization and architecture. Since then, space systems evolved and significantly grew in size, scope, and complexity. Over the past five decades, the United States invested hundreds of billions of dollars building a space program that arguably remains globally unsurpassed by any single country in size, capability[1], and cost.[2] Far exceeding the usefulness of the rudimentary satellites launched in the early days of space exploration, current space programs provide remote sensing, navigation, communication, weather and a myriad of other functions. Current systems support users from the U.S. military and Intelligence Community (IC) as well as civil organizations, commercial businesses, and individual users worldwide.

Many space systems currently fielded, as well as ones still under development, not only provide requisite services that bolster national security and ensure military dominance on the battlefield, but also set the foundation for many civilian and commercial endeavors. For example, the Defense Department's Global Positioning System (GPS) constellation offers precise positioning, navigation, and timing signals utilized by many of the U.S. military's most technologically advanced weapon systems, increasing their accuracy and lethality.[3] Additionally, a vast number of industries, to include fishing, agriculture, automotive, and air travel, spend billions of dollars annually on GPS hardware to improve their productivity, efficiency, and operational safety.[4] As a recognized force multiplier, basis for military planning and operations, and an integral part of many civilian and commercial practices, U.S. space capabilities represent a vital

national interest.[5] As such, they demand close oversight with clear and focused leadership realized through properly trained and experienced personnel managing all phases of acquisition, deployment, and operations.

Unfortunately, performance shortfalls, cost overruns, and schedule delays experienced by many our current space programs may lead to serious capability gaps resulting in increased risk to our national security.[6] The Commission to Assess United States National Security Space Management and Organization (subsequently referred to as the "2001 Space Commission" in this paper) concluded that "the political, economic and military value of space systems makes them attractive targets for state and non-state actors hostile to the United States and its interests."[7] As targets, space systems remain vulnerable to attack not only by the physical means directed at their fixed ground-based control segments and launch systems, but also in orbit as recently demonstrated by China's destruction of one of its non-operational satellites using anti-satellite (ASAT) missile technology.[8] Additionally, available technology exists that can jam or disrupt command and control links critical to the operation of satellites. Given the vital importance of our national space assets and the evolving threat from adversaries with demonstrated countermeasures, the U.S. must work through the bureaucracy and cultural differences that derail efforts to address the issues facing its space program today.

This paper provides a short background on the U.S. Space Program to help clarify issues facing the space community and define a construct to evaluate them. Next, a short summary of national space policy identifies the strategic direction and guidance placed upon the space program and focuses the direction for the analysis of

the paper. The role of a strategy is covered to illuminate the gaps existing between national space policy and the various plans implementing the policy's objectives and guidelines. The paper's analysis focuses on the issues dealing with human resources only—leadership, management, training, recruitment, and retention—leaving other potential areas of analysis, such as organization and command structure, as topics for future research. The paper concludes with recommendations to bring our state-of-the-practice space personnel programs in line with the requirements needed by the space community and demanded by Congress.

Background

Since the late 1980's, over half of the Defense Department's major space programs encountered problems during acquisition which swelled costs by hundreds of millions of dollars and in some cases nearly doubled original estimates.[9] Many faltering space programs either added years to their acquisition schedules delaying needed capabilities, or increased technical risk jeopardizing system performance.[10] Understanding the historical context of the U.S. Space Program allows for a more accurate diagnosis of its ailments. This requires a look back at the growth of the space program from a military quest to a multifaceted venture encompassing numerous military, intelligence, civil, commercial, and international entities.

Space exploration grew out of technology developed and refined during World War II under Germany's V-2 rocket program which spawned the United States Redstone missile and helped launch the U.S. Space Program. After the war, approximately 500 of Germany's best and brightest minds, including Wernher von Braun and other expatriate scientists who worked on the original V-2 rocket, continued

their work on rocket technology at Redstone Arsenal in Alabama under Operation Paperclip.[11] Developing platforms capable of reaching into space while working in guarded laboratories created a certain mystique and prestige for those associated with the program. This air of secrecy, in addition to its direct and influential role as a pivotal program contributing to national security in the early 1950s, attracted top theorists, scientists, and academia. Fueled by dedication to their work, the space program's challenging and groundbreaking research as well as its ability to capture the imagination of people worldwide kept many of these top minds engaged in some of the most important military research of their time.[12]

Today, the development of space systems within the United States involves more than just the military. In 1958, the National Aeronautics and Space Act established the National Aeronautics and Space Administration (NASA) bringing into existence the U.S. Government's civilian space program.[13] Also in the late 1950's, the Central Intelligence Agency (CIA) working in conjunction with United States Air Force at Vandenburg AFB—a precursor to the National Reconnaissance Office (NRO)—developed and launched CORONA, the first satellite program dedicated to overhead photoreconnaissance bringing the IC into the space program.[14] Originally established as a classified organization in September 1961, the NRO's existence and mission—acquiring and operating overhead collection capabilities—were declassified in 1992. The NRO currently operates under a dual reporting chain to both the Director of National Intelligence and the Secretary of Defense.[15]

Spurred on by the Soviets achieving the first manned earth orbit by Yuri Gagarin on April 21, 1961, President Kennedy subsequently promised to land a man on the

moon before the end of the decade sparking a national interest in space. Beginning with the 1962 Communications Satellite Act, subsequent laws were passed that "promoted development of new [space] systems by the private sector" expanding space development by bringing commercial space ventures into existence.[16] Further contributing to this expansion, the Department of Defense (DOD) teaming with other non-defense agencies and departments to develop space programs increased the number of U.S. departments and organizations with direct space responsibilities. One such arrangement involves the DOD's tri-agency venture with NASA and the Department of Commerce to develop the National Polar-Orbiting Operational Environmental Satellite System (NPOESS) offering the next generation meteorological capability.[17]

As the number of U.S. departments, agencies, and businesses involved in space development increased, so did the dollars allocated by Congress for space research, development, and acquisition. Commensurately, the need for skilled individuals to manage and lead these efforts also began to grow. According to the 2001 Space Commission, the security and welfare of the United States and our allies depend on our "ability to operate in space."[18] Speaking at the National Symposium on Space, General Lance Lord, then-Commander of Air Force Space Command, reiterated our need to develop space assets and "protect and defend the constellations and the kinds of capabilities we put forth from space."[19] Today more than ever, our military relies on our space programs and the capabilities they bring to the fight to maintain our military superiority and win our wars.[20] Recent national policy states that "the conduct of U.S. space programs and activities shall be a top priority" making clear the need to establish

the necessary ends, ways, and means to develop, deploy, operate, and maintain these vital national assets.[21]

Current Space Policy

On August 31, 2006, President Bush sanctioned National Security Presidential Directive (NSPD) - 49, U.S. National Space Policy, superseding Presidential Decision Directive (PDD) – 49, National Space Policy, issued September 14, 1996 under the Clinton Administration. Although the two policies were written nearly a decade apart and under the direction and influence of vastly different presidential administrations, both policies recognize the criticality of the national space program in support of our "national security, foreign policy, economic growth, environmental stewardship, and scientific and technical excellence."[22] In fact, numerous similarities exist between the two policy directives. However, one major difference stands out between the two, the strong focus of NSPD-49 on U.S leadership in space and the utilization of space capabilities in advancing national and homeland security and foreign policy objectives. Clearly driven by events issuing in the new century—namely the September 11 attacks on the World Trade Center and the Pentagon and the resulting Global War on Terrorism—the volatile and rapidly changing environment of the new millennia mandated a revised and innovative focus. To this end, the U.S. National Space Policy delineates various space guidelines—general, national security, civil and commercial—providing clear direction and solid foundation for the development of a national strategy for space.

Emphasizing the importance of space, NSPD-49 states that our ability to freely operate in space built on a robust and capable architecture remains as essential to our national interests as "air power and sea power" allowing for increased knowledge,

innovation, economic prosperity and the enhancement of national security.[23] Flowing from the guiding principles of the policy, the first fundamental goal listed by the document is to "strengthen the nation's space leadership" asserting the need to focus on human resources—in short, people. Other goals include increased exploration and scientific discovery, the enabling of a "dynamic, globally competitive domestic commercial space sector" and "a robust science and technology base."[24] All of these goals are underpinned by the need for technical leadership, space-savvy acquisition specialists, and an increasing number of individuals educated, trained, and experienced in space matters to meet the growing demand. Reinforcing the need for such qualified individuals, NSPD-49 lists "Develop Space Professionals" as the first requirement to achieve the goals of the National Space Policy. Touted as "vital to the future of U.S. space capabilities," the policy accentuates "sustained excellence" in virtually all space-related disciplines.[25]

Recently updated under the last Bush administration, many of the U.S. National Space Policy principles and goals reflect and support our national interests. Directly influencing others facets of U.S. planning such as military, information and economics, our space policy should also take into consideration other policies that may be impacted by its implementation. Since no clear overarching plan exists on how each of the higher-level or related policies—national, defense, military—are drafted, the task of pulling together a National Space Policy becomes more art than science. However, even the most skillfully crafted policy can only set the foundation. A detailed strategy must then be formulated for the development and implementation of planning rooted in our national interests. Furthermore, implementing strategy which creates the national

interest linkage between policy and planning facilitates the prioritization of goals and objectives—a key factor as programs are bounded by limited ends, ways, and means. Consequently, as the basis for directing our national space programs, U.S. National Space Policy only establishes the principles, goals, and guidelines on which to build. Unfortunately, the lack of a National Space Strategy leaves gaps in guidance and continuity linking our national interests from space policy through the development and execution of U.S. space programs.

Defining the Gaps: Strategy and People

From concept exploration and system design through launch, satellite system costs have skyrocketed with some programs costing hundreds of millions and even billions of dollars per satellite.[26] Additionally, sustainment and life cycle support costs can span from a few years to over three decades requiring millions of dollars in follow-on funding. Over fiscal year 2009, the Department of Defense alone allocated over ten billion dollars on satellite and other space systems development and acquisition.[27] Testimony before the Subcommittee on Strategic Forces in March 2008 revealed that one shortfall of space program acquisitions arises from the fact that "DOD starts its space programs too early…before it has assurances that the capabilities it is pursuing can be achieved within the available resources and time constraints."[28] The complex nature of our space systems, the billions of dollars spent annually on their acquisition and sustainment, and their significance to U.S. national interests, underscore the importance of the people who lead and manage these programs. Technical competence, acquisition proficiency, experience, and program-specific training with

continued professional development represent but a few of the characteristics requisite for these critical space professionals.

Starting with the 2001 Space Commission through the recent 2008 Independent Assessment Panel on the Organization and Management of National Security Space (2008 IAP), groups of top military, civilian, and commercial leaders as well as independent experts submitted numerous reports on the status of space leadership, organization, management, and acquisition. Scanning the operational environment, these committees and assessment panels identified several factors attributed to the failing health of our national space capabilities and the programs designed to upgrade and replace them. A common thread among these reports is the need for professional development, proficient management, and unambiguous leadership. Although better coordinated and organized today than during the 2001 Space Commission evaluation, no centralized professional development exists for our National Security Space Enterprise (NSSE). [29]

Over the last decade, space acquisition and management became the focus of senior-level discussion and debate resulting in only modest changes to how the NSSE operates. Consequently, gaps in proposed program improvements, personnel performance, and planning still exist between our current operational capability and that required to adequately manage our NSSE programs. Most recently, the 2008 IAP recommended a the establishment of a National Security Space Authority "to integrate user capability needs, set resource priorities, evaluate alternatives, develop and advocate investment plans and programs, and formulate and execute budgets."[30] However, we are no closer to a cohesive and fully integrated NSSE today than we were

at the turn of the century. Also, the professional development and training of our space cadre, to include junior officers and civilians through our executive management, remains a concern. As recruitment and retention of technical experts and acquisition specialists requisite for a healthy space program continues to compete against a growing commercial and international deficit of this critical talent, the NSSE will struggle to maintain its professional space cadre. Finally, the lack of an overarching strategy addressing the prioritization and acquisition of space programs remains a consistent shortfall identified by nearly every congressional report on the status of major space activities since the 2001 Space Commission.[31]

Why a National Space Strategy?

Strategy stands as an implementation of policy. Bounded by higher level policy, strategy provides direction and regulates subordinate plans. It ensures the national interests captured in the policy flow down and are reflected in the execution of the plan. For the planner, a strategy explains what must be accomplished, defines the limits on how, and identifies the program resources required.[32] To formulate an acceptable strategy, the strategist must have a clear understanding of the national interests, how those interests are integrated into higher policy, and the environmental dynamics that can impact those interests.[33] Prior to its implementation, strategy should meet the test of suitability, acceptability, and feasibility.[34] Specifically, the strategy must achieve the desired effect by realizing the goals established in the policy, bounded by the resources made available, and accepting the risk and consequences of trade-offs made through deliberate resource allocation.[35]

Last year, Ms. Davi M. D'Agostino, Director, Defense Capabilities and Management, U.S. Government Accountability Office (GAO) outlined the linkages among our National Security, Defense, and Intelligence Strategies, National Space Policy, and a proposed National Space Strategy. Setting the foundation for this strategy, the GAO reported to the Subcommittee on Strategic Forces that:

> According to the Director of Space Policy in the Office of the Under Secretary of Defense for Policy, in the case of space issues, a national security space strategy would originate from the National Space Policy and the National Security Strategy. The National Security Strategy, which cover both defense and intelligence activities, provide guidance to the National Defense Strategy and the National Intelligence Strategy. In addition, higher policy such as the National Space Policy guides the creation of more specific policies, such as the DOD Space Policy.[36]

As the coordinating agency for a resulting National Space Strategy, the National Security Space Office further asserted that for it to be considered a "legitimate and an official document," the DOD and IC must both "coordinate and agree on the content of this national strategy."[37] In November 2005, during a presentation to the Air Force Association National Symposium on Space, General Lance Lord, then-Commander Air Force Space Command, expressed the need to integrate the "space enterprise across this whole business area and have a combined strategy."[38] The call for a National Space Strategy has been echoed repeatedly in various reports and findings over the past decade. The 2001 Space Commission Report recommended that the President develop a "long-term strategy for sustaining the nation's role as the leading space-faring nation."[39] Most recently, the 2008 Independent Assessment Panel reaffirmed the need for the President to "establish and lead the execution of a National Space Strategy."[40] To date, the United States has not issued a National Space Strategy implementing

National Space Policy even though the National Security Space Office drafted a strategy back in 2004.[41]

As a result, lack of a consensual, comprehensive, and strategic direction allows our space programs to drift off course. Meanwhile, streaming requirements for more space-based capability, increased coverage, and wider usage outpaces our development efforts and budget allocations. Consequently, our efforts need to be brought back into alignment through the implementation of a well-defined and clearly articulated strategy that addresses the issues the NSSE currently faces.[42] Strategy defines how leadership utilizes its available means to achieve a desired end state in support of a defined national interest and is essential because lack or failure of strategy leads to crisis management.[43] Consequently, the current lack of a national space strategy counters the unity of effort and deliberate action that maximizes capabilities and utilization of resources. Thus, to deal with the issues facing the NSSE, addressing the absence of a National Space Strategy must rank among one of our highest priorities.

Analysis: Focus on People

As the Commander, Air Force Space Command, General Lance W. Lord recognized the importance of the space professional and the development of this elite group. Speaking at the 2005 National Symposium on Space, he stressed the need to "develop our people and horizontally integrate within the space community."[44] A few months earlier addressing the Senate Armed Services Committee Strategic Forces Subcommittee, General Lord testified, "The future of our young space force hinges on the development of our most precious and valuable resource; our people."[45] He affirmed

that Air Force leaders established as one of the highest priorities for our country, "developing and maintaining our space professionals."[46] Furthermore, these space professionals, who must be "highly skilled in their respective fields of operations, developmental engineering, acquisition and research are indispensable to our success today and will only grow in importance."[47] In summary, the success level of sustaining the capabilities rendered by our highly technical and complex space program is directly linked to our ability to cultivate and maintain a cadre of space professionals capable of directing, developing and maintaining these essential national resources.

Outlining five separate and distinct reasons, the 2001 Space Commission "unanimously concluded that organizational and management changes were needed" within the NSSE.[48] To defend and justify the billions of dollar budgeted annually, senior leaders and executive managers of space programs must maintain a basic understanding of the technologies utilized by their programs as well as the risks inherent in their use. Unlike the Army's state-of-the-art Future Combat System currently in development or the Air Force's technologically advanced F-22 Raptor fighter aircraft, once developed and launched, satellites cannot be retrieved easily for upgrade or modification. As a system of integrated and interdependent systems, each satellite subsystem relies on the timely and successful development and integration of the other to ensure judicious acquisition progression. Therefore, the individuals that lead and manage these programs must remain knowledgeable on current technology, educated on the latest space systems advancements, and conversant with acquisition reform. Instead, however, "military leaders with little or no previous experience or expertise in space technology or operations often lead space organizations."[49] Over 80% of the flag

officers and 65% of the field grade officers in space operations list primary career backgrounds other than space and average less than five years of space experience.[50] Additionally, since many of these positions are held by military that may be reassigned before a single acquisition phase is completed; the need for succession planning within the program office becomes imperative to ensure transition with minimal impact to the acquisition.

In July 1993, the Defense Science Board (DSB) Task Force on Defense Acquisition Reform (DAR) recommended that in order to "respond to the future industrial and security environment" the defense community must "establish a comprehensive education, training, communications, and outreach program for government, industry, and the public."[51] Eight years earlier, the 2001 Space Commission emphasized space education and training focusing on the diminishing group of space professionals at the senior level of command.[52] More recently, the Government Accounting Office provided several recommendations to address the problems existing within our space programs; however, several of these "solutions" are merely based on elementary program management tenets and fundamental system acquisition principles.[53] In contrast, the 1993 DSB Task Force argued that achieving "fundamental reform will require a major commitment by senior defense leadership."[54] Whether espousing broad-brush changes or more focused and directed solutions, both communities recognized the need for the development of personnel across the NSSE.

Responding to the recommendations set forth by the 2001 Space Commission Report to develop and educate senior space professionals, the National Security Space Institute (NSSI) officially stood up in October of 2004.[55] Based on the two former DOD

schools whose core mission focused on a space-related curriculum—the Space Tactics School and the Space Operations School—the NSSI operates as the Department of Defense's nexus for educating and training our space professionals.[56] NSSI augments current space-related programs at the Air University, the Air Force Institute of Technology (AFIT), and the Naval Postgraduate School (NPS).[57] Learning from problems experienced from the earlier programs, the NSSI developed a new curriculum for the development of a professional, well-educated space cadre ranging from space fundamentals through mid-level and executive-level training.[58] Comprised of faculty from the National Reconnaissance Office, NASA, and the Defense Acquisition University, NSSI provides training for over 2,000 students annually. [59] Although several base-level and technically-focused courses populate their course catalog, only a single option currently exists for mid-level and executive-level space professionals, Space 200 and Space 300 respectively.[60] This severely limits those individuals within the space community who desire advanced training to improve performance but are not seeking an advanced degree in space systems engineering or a related field.

For professionals seeking a master's degree, AFIT functions as the Air Force's graduate school for engineering and management. A component of Air University and Air Education and Training Command, AFIT offers graduate and professional continuing education for our air and space forces filling a critical educational need.[61] However, following the cancellation of the Apollo program and the elimination of the "technical undergraduate degree from the space-operations career field", AFIT experienced a sharp decline in the number of undergraduates with astronautical and space operations degrees.[62] As a result, the number of senior professionals obtaining advanced degrees

in space related fields has dropped by more than one-half with less than fifteen Master of Science, Astronautics and Space Systems degrees awarded in 2004.[63]

When combined, NSSI and AFIT provide quality training through hundreds of course offerings annually. Unfortunately, the NSSE professional space cadre still cannot meet the demand for qualified, technically trained individuals to manage ongoing space acquisitions. To help bridge this gap, the DOD and IC utilize technical experts working for Federally Funded Research and Development Centers (FFRDC) such as Aerospace Corporation and MITRE. These technically knowledgeable personnel are used extensively to provide support and guidance on advanced technology and "corporate knowledge" where continuity over the total acquisition life cycle is imperative.[64] However, junior officers and entry-level civilians often rely on their management for technical guidance when dealing with the complex system trade-offs and risk analysis that pervade space systems development. Because of the complexity of satellite design and the push to incorporate new technologies, technical competence as well as a solid understanding of space system acquisition are necessary for daily decision making and risk analysis. The ability to assess risk and factor it into the trade space for system engineering comprises an integral part of the program manager's responsibility and forms the foundation of sound acquisition competency. Therefore, it logically follows that in order to effectively and proficiently manage our complex space systems, carefully planned and executed training programs must exist that afford our space systems managers the opportunity to maintain their technical expertise and acquisition prowess. Consequently, one must ask what is needed to close the gap and advance the "state-of-the-practice" to "state-of-the-art" when implementing our national policy with respect to

our critical need to develop and maintain our professional space cadre—a change in culture recognizing their importance to national security and an integral player in the well-being of our military, economic, an intelligence endeavors.

Finally, the Intelligence Community, Department of Defense, and other organizations supporting the NSSE must identify and execute a strategy for the recruitment and retention of "technically competent" space professionals to adequately manage the acquisition of our nation's space programs.[65] In 2006, the Office of Personnel Management reported that nearly 60% of the government's current technical workforce and over 90% of the senior executives will be retirement eligible by 2016.[66] If this calculated number of civilian employees eligible for retirement over the next seven years actually left government service, the resulting loss of support and technical expertise could dramatically impact our space programs.[67] In response to the declining civilian workforce, the Air Force is attempting to change policy to make it easier to hire new civilians by cutting the number of days managers have to make a selection in half—from 90 to 45 days.[68] Air Force Personnel Command also recommends that managers submit personnel actions as soon as known vacancies are uncovered to speed up the hiring process and prevent billets from being left unfilled for long periods, thus reducing productivity impacts and countering the possibility of the loss of the vacant billet. Although addressing the need to expedite the recruitment of new personnel, this measure overlooks the need for retention and a systematic and calculated process for replacing lost talent.

Recommendations

The Independent Assessment Panel on the Organization and Management of National Security Space writing to the Chairman, Senate Committee on Armed Services stated that “without significant improvements in the leadership and management of [our NSSE] programs, U.S. space preeminence will erode to the extent that space ceases to provide a competitive national security advantage.”[69] Supported by the Institute for Defense Analysis, the Independent Assessment Panel’s final report provided an assessment with recommendations regarding the organization, education, training, and management of NSSE personnel explicating the need for a clear and immediate focus on our human resources. Representing the foundation and future of our space dominance, our professional space cadre constitutes the nucleus around which our NSSE programs are built. Consequently, any action taken to mitigate the problems we are currently facing must concede that unity of effort can only be achieved through interagency cooperation and consensus. Given that a coordinated effort among all components of the NSSE remains a key ingredient to success, the following recommendations are posited.

First, recognizing education and training for the professional space cadre constitutes a core element of the acquisition, sustainment, and expansion of our space programs, one course of action must focus on strengthening this aspect of personnel development. Drawing on the diversity of agencies, organizations, and businesses involved in space programs, a center of excellence (COE) for space with representation from the entire National Security Space Enterprise should be established. Once established, the Space COE would conduct a thorough evaluation of the space community to determine specific needs and develop roadmaps for educational

development based on community “best practices.” Centering on intermediate through senior-level education, the Space COE would identify methodologies to enhance proficiency in the areas of system acquisition, technology advancements, and program management. Utilizing the roadmaps and programs developed by the Space COE, the NSSI could expand training for the purposes of professional development and continued education for the more senior space professionals complementary to the AFIT and NPS graduate and doctorate level programs for space systems. Most importantly, funding for this training program should be obtained through “fair share” cost estimates based on need and number of personnel trained and assessed against each element of the NSSE. Furthermore, since real authority comes from control over resource allocation and not program oversight, funding remains critical to the success of any training transformation.

Second, implementing a mandatory retention period for major acquisition managers achieving acceptable performance ratings, such as the four-year period recommended by the 2008 IAP, would move the space community in the right direction.[70] As military officers ascend in rank, lengths of assignments typically shorten often resulting in reassignment within two years.[71] Although a certain level of early and unexpected reassignments of military and civilian personnel is inevitable, minimizing rotations for key management positions provides stability and continuity. Taking the 2008 IAP recommendation a step farther, a more refined approach could focus this stability around critical program events. Rather than implementing fixed retention period over an arbitrary time frame as recommended, retention should be tied to key acquisition milestones and decision points. Furthermore, the utilization of civilians in

certain key positions could help to maintain continuity while obtaining highly specialized expertise via FFRDC support. In addition, succession planning for top positions would promote targeted training as well as assist with projected enrollment levels ensuring adequate course offerings for senior management permitting training to occur prior to personnel assignment minimizing impact to programs.

Third, since agreement cannot be reached between the DOD and IC on the specifics of an overarching National Space Strategy, the development and implementation of a separate National Military Space Strategy and National Intelligence Space Strategy would provide better defined goals and provide a more lucid prioritization of programs in the interim.[72] The judicious allocation of the limited resources supporting space endeavors can only be obtained through cooperation and coordination across all elements of the NSSE. Until consensus can be reached on a NSPS, organizations managing national security space efforts will continue to grapple over the highly scrutinized funding and limited professional space talent available. Issuing national-level guidance in the form of a space strategy, even if issued under separate strategies for the DOD and IC, would provide a lens for deliberate analysis of the resources supporting the development and prioritization of current space programs their importance to our national interests.

Conclusions

Given the growing reliance on space capabilities by all facets of the NSSE, these orbiting assets will remain a vital component to U.S. national interests well into the future. As force multipliers and enablers integral to our military dominance in the "battlespace," space systems also underpin many of our military operations and

function as a cornerstone to mission success.[73] For our adversaries, space becomes a target and a vulnerability to military operations. Reaching this same conclusion, the 2001 Space Commission references and warns of a possible "Pearl Harbor" in space—a preemptive attack aimed at blinding our eyes in space and muting our ability to effectively communicate oceans apart.[74] Consequently, our space capabilities warrant protection via the watchful eyes of a dedicated and well-trained professional space cadre throughout all phases of development, deployment, and operations.

The strategic environment for space is changing and a myriad of global influences challenge our national interests. As we establish and prioritize our national interests to counter ever-changing threats, our leadership must remain agile and ensure our strategies which drive our strategic assets remain relevant allowing our limited resources to provide maximum impact. Within our space community, senior U.S. leadership must develop and implement a strategy that balances the ends, ways, and means upon a comprehensive risk assessment to ensure critical national capabilities are developed, fielded, and maintained with good fiscal management and technical competence.[75] As stated by General Lord before the Senate Armed Services' Strategic Forces Subcommittee, "We need to ensure technical issues are researched and a solid technical risk mitigation plan is created and followed."[76] Given the critical nature of our vital space assets and their direct support to our national interests, failure in this area carries heavy strategic costs.

Endnotes

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[29] The National Security Space Enterprise (NSSE) represents the community of government and non-government organizations who provide and operate our space-based assets for the U.S. military and Intelligence Community. Referred to as simply "National Security Space" in the Leadership, Management, and Organization for National Security Space, Report to Congress of the Independent Assessment Panel on the Organization and Management of National Security Space published in 2008, the distinct was made to avoid confusion between National Security Space and National Space Strategy whose acronyms are both NSS.

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[31] Over the past decade, the lack of an overarching strategy appears as an issue in several reports regarding the overall health and status of the National Security Space Enterprise. A partial list of the reports citing this shortfall include: the 2008 Independent Assessment Panel, GAO-08-552T – Space Acquisitions: Major Space Programs Still at Risk for Cost and Schedule Increases, GAO-08-516 – Space Acquisitions: DOD Is Making Progress to Rapidly Deliver Low Cost Space Capabilities, but Challenges Remain, GAO-08-431R - Defense Space Activities: National Security Space Strategy Needed to Guide Future DOD Space Efforts, GAO-07-730T – Space Acquisitions: Actions Needed to Expand and Sustain Use of Best Practices, GAO-06-626T – Space Acquisition: Improvements Needed in Space Systems Acquisitions and Keys to Achieving Them, and the 2001 Space Commission Report.

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[58] To supplement the portfolio of courses available for space professionals, Air Force Space Command entered into a memorandum of understanding (MOU) with a group of ten universities establishing the Space Education Consortium placing the University of Colorado at Colorado Springs as the lead university. The consortium offers various courses and curriculum across the United States to include overseas facilities to assist in the education of our space cadre for the Air Force and other military services, U.S. Government agencies and organizations as well as private industry. In a relatively short period of time, the National Security Space Institute established our current space education and training program in keeping with National Space Policy goals and guidelines. Acting as the Defense Department’s central office for space education and training, NSSI offers foundational courses designed to develop the space experts and leaders required to manage our complex space programs.

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